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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,453	08/22/2001	Kenji Shintani	401352/FUKAMI	7034
23548	7590	10/23/2003	EXAMINER	
LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960			CHEN, KIN CHAN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/934,453

Applicant(s)

SHINTANI ET AL.

Examiner

Kin-Chan Chen

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 11-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0801.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of group 1, claims 1-10 (September 30, 2003) is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Specification***

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komada (US 6,627,554).

Komada teaches a method comprising a wafer treatment of a first part of the wafer having a first etching property and a second part of the wafer having a second etching property different from the first etching property, in a chamber with a gas for etching. The gas for etching may be introduced into the chamber. Komada teaches using hydrofluoric acid or  $\text{CF}_4$  to remove the reaction product formed of silicon compound only (col. 2, lines 9-27). Because Komada teaches using hydrofluoric acid or fluorine compound to remove the reaction product formed of silicon compound, and it is conventional that hydrofluoric acid or fluorine compound may also be used to etch insulating layer. Hence, it would have been obvious to one with ordinary skilled in the art that process optimization may be applied in order to supply the gas for etching for a time longer than the first starting time but shorter than the second starting time because Komada teaches removing the reaction products without cause any problem in fabricating the semiconductor device which including the insulating layer in the structure. Komada teaches using fluorine compound such as  $\text{CF}_4$  but not limited to  $\text{CF}_4$ . Hence, it would have been obvious to one with ordinary skilled in the art to use different fluorine compound and combinations thereof (so-called a reaction accelerating gas in claims 4-6) through routine experimentation in order to improve etching efficiency.

5. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh (US 6,144,087) in view of Komada (US 6,627,554).

Satoh is relied on to teach the conventional gate electrode fabrication such as forming a gate insulating film on the substrate, forming a gate electrode on the

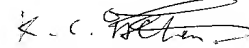
insulating film, the wafer contains a reaction product generated before forming the gate electrode, covering the gate insulating film. Satoh teaches using removing the reaction product with a hydrofluoric acid aqueous solution (abstract; col. 4, lines 15-40).

Unlike the claimed invention, Satoh does not teach using hydrofluoric acid (so-called hydrofluoric acid gas in instant claims) to remove the reaction product. In a method of remove the reaction product, Komada teaches using hydrofluoric acid or fluorine compound to remove the reaction product formed of silicon compound, and it is conventional that hydrofluoric acid or fluorine compound may also be used to etch insulating layer. Hence, it would have been obvious to one with ordinary skilled in the art that process optimization may be applied in order to supply the gas for etching for a time longer than the first starting time but shorter than the second starting time because Komada teaches removing the reaction products without cause any problem in fabricating the semiconductor device which including the insulating layer in the structure. Komada teaches using fluorine compound such as  $\text{CF}_4$  but not limited to  $\text{CF}_4$ . Hence, it would have been obvious to one with ordinary skilled in the art to use different fluorine compound and combinations thereof (so-called a reaction accelerating gas in claims 4-6) through routine experimentation in order to improve etching efficiency. Komada teaches using hydrofluoric acid to remove the reaction product formed of silicon compound in order to prevent layers peel-off (col. 2, lines 9-27). Hence, it would have been obvious to one with ordinary skilled in the art to use hydrofluoric acid of Komada in the process of Satoh so as to prevent layers peel-off.

Komada teaches removing the reaction products without cause any problem in fabricating the semiconductor device which including the insulating layer in the structure. The above-cited claims differ from the combined prior art by specifying using processing parameters (such as repeatedly supplying the gas for etching; evacuating the chamber and alternatively supplying the gas for etching). However, it would have been obvious to one with ordinary skilled in the art to perform same by routine experiment. The process of conducting routine optimizations so as to produce an expected result is obvious to one of ordinary skill in the art. A person having ordinary skill in the art would have found it obvious to modify the combined prior by performing routine experiments using different processing parameters to obtain optimal result.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

October 21, 2003

  
Kin-Chan Chen  
Primary Examiner  
Art Unit 1765